

WHAT IS CLAIMED IS:

1. A method for managing data streams, comprising:
receiving a plurality of packets, each packet associated with a data connection,
at least some of the packets being part of a data stream;
5 performing congestion control by discarding at least some of the packets; and
setting an indicator in at least some of the subsequent packets in the data
stream if packets have been discarded from the data stream, the indicator operable to
indicate that packets in the data stream have been discarded.

- 10 2. The method of Claim 1, wherein the data stream comprises time
sensitive data.

- 15 3. The method of Claim 2, wherein the time sensitive data comprises real-
time data.

4. The method of Claim 2, wherein the time sensitive data comprises
audio data.

- 20 5. The method of Claim 1, further comprising:
determining whether packets in the data stream may be discarded; and
dropping packets from the data stream only if packets in the data stream may
be discarded.

- 25 6. The method of Claim 1, further comprising:
performing congestion control based on priority of the packets; and
setting an indicator in subsequent packets in the data stream by increasing a
priority indicator in the subsequent packets.

7. The method of Claim 1, wherein the packets discarded from the data stream comprises no more than the packets that contain data representing twenty milliseconds of audible sound in a group of packets that contain data representing one-hundred milliseconds of audible sound.

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8. The method of Claim 1, further comprising:
determining whether the number of packets discarded from the data stream exceeds a threshold; and
setting an indicator in response to the number of packets in the set exceeding
10 the threshold.

9. The method of Claim 8, wherein the threshold is based on the amount and type of data in each packet.

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10. The method of Claim 1, wherein the packets in the data stream are Internet protocol packets, and the indicator is the type-of-service indicator.

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11. A set of logic encoded in media for managing data streaming data, the logic operable to:

receive a plurality of packets, each packet associated with a data connection, at least some of the packets being part of a data stream;

5 perform congestion control by discarding at least some of the packets; and

set an indicator in at least some of the subsequent packets in the data stream if packets have been discarded from the data stream, the indicator operable to indicate that packets in the data stream have been discarded.

10 12. The logic of Claim 11, wherein the data stream comprises time sensitive data.

13. The logic of Claim 12, wherein the time sensitive data comprises real-time data.

15 14. The logic of Claim 12, wherein the time sensitive data comprises audio data.

16. The logic of Claim 11, wherein the logic is further operable to:
20 determine whether packets in the data stream may be discarded; and
discard packets from the data stream only if packets in the data stream may be discarded.

25 16. The logic of Claim 11, wherein the logic is further operable to:
perform congestion control based on priority of the packets; and
set an indicator in subsequent packets in the data stream by increasing a priority indicator in the subsequent packets.

17. The logic of Claim 11, wherein the logic is further operable to:
determine the amount of audible sound represented by each packet; and
establish packets being discarded as being no more than the packets that
contain data representing twenty milliseconds of audible sound in a group of packets
5 that contain data representing one-hundred milliseconds of audible sound.

18. The logic of Claim 11, wherein the logic is further operable to:
determine whether the number of packets discarded from the data stream
exceeds a threshold; and
10 set an indicator in response to the number of packets in the set exceeding the
threshold.

19. The logic of Claim 18, wherein the threshold is based on the amount
and type of data in each packet.

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20. The logic of Claim 11, wherein the packets in the data stream are
Internet protocol packets, and the indicator is the type-of-service indicator.

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21. An apparatus for managing data streams, comprising:
means for receiving a plurality of packets, each packet associated with a data connection, at least some of the packets being part of a data stream;
means for performing congestion control by discarding at least some of the
5 packets; and
means for setting an indicator in at least some of the subsequent packets in the data stream if packets have been discarded from the data stream, the indicator operable to indicate that packets in the data stream have been discarded.
- 10 22. The apparatus of Claim 21, wherein the data stream comprises time sensitive data.
- 15 23. The apparatus of Claim 22, wherein the time sensitive data comprises real-time data.
- 20 24. The apparatus of Claim 22, wherein the time sensitive data comprises audio data.
25. The apparatus of Claim 21, further comprising:
means for determining whether packets in the data stream may be discarded;
and
means for discarding packets from the data stream only if packets in the data stream may be discarded.
- 25 26. The apparatus of Claim 21, further comprising:
means for performing congestion control based on priority of the packets; and
means for setting an indicator in subsequent packets in the data stream by increasing a priority indicator in the subsequent packets.

27. The apparatus of Claim 21, wherein the packets discarded from the data stream comprise no more than the packets that contain data representing twenty milliseconds of audible sound in a group of packets that contain data representing one-hundred milliseconds of audible sound.

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28. The apparatus of Claim 21, further comprising:
means for determining whether the number of packets discarded from the data stream exceeds a threshold; and
means for setting an indicator in response to the number of packets in the set
10 exceeding the threshold.

29. The apparatus of Claim 28, wherein the threshold is based on the amount and type of data in each packet.

15 30. The apparatus of Claim 21, wherein the packets in the data stream are Internet protocol packets, and the indicator is the type-of-service indicator.

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31. A network element for transporting packetized data, comprising:
a communication interface operable to receive a plurality of Internet protocol (IP) packets, each packet associated with a data connection, at least some of the packets being part of a data stream containing audio data;
5 a memory coupled to the communication interface, the memory operable to buffer the IP packets; and
a processor coupled to the memory, the processor operable to:
perform congestion control based on a priority value in the type-of-service (TOS) field of each packet, and
10 increase the priority value in the TOS field for at least some of the subsequently routed packets in the data stream to indicate that packets in the data stream have been discarded if packets in the data stream have been discarded.
32. The network element of Claim 31, wherein no more than the packets
15 that represent thirty milliseconds of audio in a group of packets that represent one-hundred milliseconds of audio may be discarded.
33. The network element of Claim 31, wherein the indicator is set in the
next five subsequently routed packets in the data stream.
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34. The network element of Claim 31, wherein the processor is further
operable to determine the number of subsequently routed packets in the data stream in
which to increase the priority.
- 25 35. The network element of Claim 31, wherein the processor is further
operable to determine if packets in the data stream may be discarded.

36. A propagated signal on a transmission medium in a network, comprising:

an Internet protocol (IP) packet of a data stream, the IP packet including a header and a payload;

5 the header including an indicator adjusted in the network based on discards of preceding IP packets from the data stream; and

the payload containing time sensitive data.

37. The signal of Claim 36, wherein the value in the type-of-service field
10 in the header is the indicator.

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38. A system for managing time sensitive data streams across a network, comprising a plurality of routing devices coupled to each other, the routing devices operable to receive and route packets, at least some of the packets being part of a data stream, the routing devices further operable to determine if they are congested and 5 discard packets to alleviate the congestion, the routing devices additionally operable to set an indicator in subsequently routed packets in the data stream if packets are discarded from the data stream.

39. The system of Claim 38, wherein:
10 the packets in the data stream contain data representing audible sound; and no more than the packets that represent thirty milliseconds of audible sound in a group of packets that represent one-hundred milliseconds of audible sound may be discarded.

15 40. The system of Claim 38, wherein the indicator is set in the next five subsequently routed packets in the data stream.

20 41. The system of Claim 38, wherein the processor is further operable to determine the number of subsequently routed packets in the data stream in which to set the indicator.

25 42. The system of Claim 38, wherein:
the packets are Internet protocol packets; and
the indicator is the value in the type-of-service field.

43. The system of Claim 38, wherein the routing devices are further operable to determine if packets in the data stream may be discarded.